a matching circuit having a variable capacitance diode for matching the antenna impedance and an impedance of the transmission/reception circuit according to the voltage of the controller.

4. (Amended) A device as claimed in claim 1, wherein the matching circuit includes:

an inductor having a first end connected to the antenna and a second end connected to the transmission/reception circuit;

a first capacitor having a first end connected to the second end of the inductor and the transmission /reception circuit, and a second end grounded;

a second capacitor having a first end connected to the antenna and the first end of the inductor, and having a second end connected to ground; and

a variable capacitance diode having a first end connected to the antenna and the first end of the inductor, and having a second end connected to ground,

wherein a capacitance of the variable capacitance diode is varied according to the voltage of the controller.

5. (Amended) A device as claimed in claim 1, wherein the controller includes:

a memory for storing data for an optimal antenna impedance matching for the folded state and the opened state of the folder casing;

a central processing unit (CPU) for reading the data from the memory according to a signal from the folder sensor; and

a digital-to-analog converter (DAC) for converting the data from the CPU into an analog voltage and providing the analog voltage to the matching circuit.

6. (Amended) A device as claimed in claim 5, wherein the DAC includes:

a variable pulse generator for receiving a control signal and a data signal, which is based on the open state and the folded state of the folder casing, from the CPU and in response to the control signal varying one selected from the group consisting of pulse widths and pulse densities; and

an integrating circuit for integrating pulses received from the variable pulse generator and providing an integrated output signal to the matching circuit.

7. (Amended) A device for matching an antenna impedance in a portable radio telephone having a transmission/reception circuit, comprising:

means for sensing whether the portable radio telephone is in transmit mode or receive mode and in response thereto providing a sensing signal;

a controller for providing a control voltage in response to the sensing signal; and

means for matching an impedance of the antenna and an impedance of the transmission/reception circuit according to the control voltage from the controller, wherein the impedance is matched based on whether the portable radio telephone is receiving as opposed to when it is transmitting.

8. (Amended) A device as claimed in claim 7, wherein the controller includes:

a central processing unit (CPU) for receiving the sensing signal and providing a digital voltage corresponding to the sensing signal, wherein the sensing signal indicates whether the portable radio telephone is in transmit mode or receive mode; and

a digital/analog converter for receiving the digital voltage and converting the digital voltage into the control voltage and providing the control voltage to the means for matching the impedances.

10. (Amended) A device as claimed in claim 7, wherein the means for matching the impedance includes:

an inductor having a first end connected to the antenna and a second end connected to the transmission/reception circuit;

a first capacitor having a first end connected to the second end of the inductor and the transmission /reception circuit, and a second end grounded;

a second capacitor having a first end connected to the antenna and the first end of the inductor, and having a second end connected to ground; and

a variable capacitance diode having a first end connected to the antenna and the first end of the inductor, and having a second end connected to ground,

wherein a capacitance of the variable capacitance diode is varied according to the control voltage.

12. (Amended) A device as claimed in claim 11, wherein the means for matching impedances includes:

a controller for receiving the sensing signal indicating whether the foldable casing is in the folded or unfolded position, wherein the controller provides a digital voltage corresponding to the sensing signal;

a digital-to-analog converter for converting the digital voltage into an analog voltage; and

a matching circuit for matching an impedance of the antenna and an impedance of the transmission/receiving circuit in response to the analog voltage.

16. (Amended) A device as claimed in claim 12, wherein the matching circuit includes:

an inductor having a first end connected to the antenna and a second end connected to the transmission/reception circuit;

a first capacitor having a first end connected to the second end of the inductor and the transmission /reception circuit, and a second end grounded;

a second capacitor having a first end connected to the antenna and the first end of the inductor, and having a second end connected to ground; and

a variable capacitance diode having a first end connected to the antenna and the first end of the inductor, and having a second end connected to ground,

wherein a capacitance of the variable capacitance diode is varied according to the analog voltage.

17. (Amended) A device for matching an antenna impedance in a portable radio telephone including a radio having transmission and receiving circuits, a foldable casing enclosing the radio, the foldable casing movable between an unfolded position and a folded position, and an antenna movable between an extracted position from the foldable casing and a retracted position into the foldable casing, the device comprising:

means for sensing whether the foldable casing is in the unfolded position, and for sensing whether the antenna is in the extracted position, and for providing a sensing signal in response thereto;

a measurement device for providing a RF signal to the antenna and for measuring an RF signal from the antenna;

a controller for controlling the measurement device to provide the RF signal to the antenna in a reception mode, and to measure the RF signal from the antenna in a transmission mode, and for determining optimal antenna impedance matching values for transmitting and receiving, respectively, as well as the folder casing and antenna positions, and for storing the optimal impedance matching values; and

means for adjusting an impedance match between the antenna and the radio in response to the sensing signal under the control of the controller for each folder casing position, antenna position, and transmission and reception mode to vary an antenna impedance matching, the controller measuring a transmission level in the transmission mode and a reception sensitivity in the reception mode every time the antenna impedance matching is varied, to determine optimal antenna impedance matching values for each folder casing position, antenna position, and transmission and reception mode, and to store the optimal antenna impedance matching values therein.

18. (Amended) A device as claimed in claim 17, wherein the means for adjusting the impedance match includes:

a central processing unit (CPU) adjusting a voltage by a fixed increment from 0V to a fixed voltage level in response to the sensing signal under the control of the controller for

each folder casing position, antenna position, and transmission and reception mode to vary an antenna impedance matching, and for causing the controller to measure the transmission level in the transmission mode and the reception sensitivity in the reception mode every time the antenna impedance matching is varied, and for providing a control signal for storing the optimal antenna impedance matching values;

a memory for storing the optimal antenna impedance matching values under the control of the CPU;

a digital-to-analog converter for converting the voltage provided by the CPU into an analog voltage; and

a matching circuit for matching the impedance of the antenna and an impedance of the radio in response to the analog voltage.

20. (Amended) A device as claimed in claim 18, wherein the matching circuit includes:

an inductor having a first end connected to the antenna and a second end connected to the transmission/reception circuit;

a first capacitor having a first end connected to the second end of the inductor and the transmission /reception circuit, and a second end grounded;

a second capacitor having a first end connected to the antenna and the first end of the inductor, and having a second end connected to ground; and

a variable capacitance diode having a first end connected to the antenna and the first end of the inductor, and having a second end connected to ground,

wherein a capacitance of the variable capacitance diode is varied according to the analog voltage.

22. (Amended) The portable radio terminal of claim 21, wherein said impedance matching system further comprises:

a processor which receives the sensing signal and outputs a digital control signal in response to whether the foldable casing is in the open position and whether the antenna is in the extended position; and

a digital to analog converter which receives the digital control signal and provides a varactor tuning voltage in response thereto.

23. (Amended) The portable radio terminal of claim 22, wherein said processor comprises a memory which stores a predetermined digital value representing a varactor voltage value for matching said impedances, wherein said processor reads said digital value and outputs the digital control signal corresponding to the sensing signal.

24. (Amended) The portable radio terminal of claim 22, wherein said processor comprises a memory comprising a plurality of memory locations, each location storing a corresponding predetermined digital value representing a varactor voltage value for matching said impedances, wherein said processor reads one of said digital values in response to the sensing signal and outputs the digital control signal corresponding to the sensing signal.

25. (Amended) The portable radio terminal of claim 24, wherein said memory includes eight memory locations comprising:

a first memory location storing a corresponding predetermined digital value representing a varactor voltage value for matching said impedances when the antenna is extended, the foldable casing is open, and the portable radio terminal is receiving;

a second memory location storing a corresponding predetermined digital value representing a varactor voltage value for matching said impedances when the antenna is extended, the foldable casing is open, and the portable radio terminal is transmitting;

a third memory location storing a corresponding predetermined digital value representing a varactor voltage value for matching said impedances when the antenna is extended; the foldable casing is closed, and the portable radio terminal is receiving;

a fourth memory location storing a corresponding predetermined digital value representing a varactor voltage value for matching said impedances when the antenna is extended, the foldable casing is closed, and the portable radio terminal is transmitting;

a fifth memory location storing a corresponding predetermined digital value representing a varactor voltage value for matching said impedances when the antenna is retracted, the foldable casing is open, and the portable radio terminal is receiving;

a sixth memory location storing a corresponding predetermined digital value representing a varactor voltage value for matching said impedances when the antenna is retracted, the foldable casing is open, and the portable radio terminal is transmitting;

a seventh memory location storing a corresponding predetermined digital value representing a varactor voltage value for matching said impedances when the antenna is retracted, the foldable casing is closed, and the portable radio terminal is receiving; and

an eighth memory location storing a corresponding predetermined digital value representing a varactor voltage value for matching said impedances when the antenna is retracted, the foldable casing is closed, and the portable radio terminal is transmitting.

26. (Amended) The portable radio terminal of claim 21, wherein said impedance matching circuit further comprises:

an inductor having a first end and a second end being connected in series between said antenna and said radio;

a first capacitor connected between said varactor and the first end of said inductor; and

a second capacitor connected between the second end of said inductor and a reference voltage.

27. (Amended) The portable radio terminal of claim 26, wherein said impedance matching system further comprises:

a processor receiving the sensing signal and outputting a digital control signal in response thereto; and

a digital to analog converter receiving the digital control signal and providing a varactor tuning voltage in response thereto.

28. (Amended) The portable radio terminal of claim 27, wherein said processor comprises a memory storing a predetermined digital value representing a varactor voltage value for matching said impedances, wherein said processor reads said digital value and outputs the digital control signal in response thereto.

29. (Amended) The portable radio terminal of claim 27, wherein said processor comprises a memory having a plurality of memory locations, each location storing a corresponding predetermined digital value representing a varactor voltage value for matching said impedances, wherein said processor reads one of said digital values in response to the sensing signal and whether the portable radio terminal is transmitting or receiving, and outputs the digital control signal in response thereto.

30. (Amended) The portable radio terminal of claim 21, wherein said impedance matching circuit further comprises:

an inductor having a first end and a second end being connected in series between said antenna and said radio;

a first capacitor connected between the first end of said inductor and a reference voltage; and

a second capacitor connected between the second end of said inductor and the reference voltage,

wherein the varactor is connected between the first end of said inductor and the reference voltage.

31. (Amended) The portable radio terminal of claim 21, wherein said sensing means includes a folder switch.

32. (Amended) A portable radio terminal, comprising:

a radio having transmitting and receiving circuits;

a sensor for sensing whether the portable radio terminal is in transmit mode or receive mode and for producing at least one sensing signal indicating whether the portable radio terminal is in transmit mode or receive mode; and

an impedance matching system for matching an impedance of said antenna and an impedance of said radio, said impedance matching system receiving the sensing signal and including an impedance matching circuit having a varactor, the varactor having a varactor voltage which is changed in response to the sensing signal for tuning the impedance matching circuit based on whether the radio is transmitting or receiving.

33. (Amended) The portable radio terminal of claim 32, wherein said impedance matching system further comprises:

a processor which receives the sensing signal and outputs a digital control signal in response to the sensing signal; and

a digital to analog converter which receives the digital control signal and provides a varactor tuning voltage in response thereto.

34. (Amended) The portable radio terminal of claim 33, wherein said processor comprises a memory which stores a predetermined digital value representing a varactor voltage value for matching said impedances, wherein said processor reads said digital value and outputs the digital control signal in response thereto.

35. (Amended) The portable radio terminal of claim 33, wherein said impedance matching circuit further comprises:

an inductor having a first end and a second end being connected in series between said antenna and said radio;

a first capacitor connected between said varactor and the first end of said inductor; and

a second capacitor connected between the second end of said inductor and a reference voltage.

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36. (Amended) The portable radio terminal of claim 33, wherein said impedance matching circuit further comprises:

an inductor having a first end and a second end being connected in series between said antenna and said radio;

a first capacitor connected between the first end of said inductor and a reference voltage; and

a second capacitor connected between the second end of said inductor and the reference voltage,

wherein the varactor is connected between the first end of said inductor and the reference voltage.

37. (Amended) A method of producing a portable radio terminal which includes a radio having transmitting and receiving circuits; a foldable casing enclosing said radio, said foldable casing movable between an open position and a folded position; an antenna movable

between a retracted position into said foldable casing and an extended position extended from said foldable casing; means for sensing whether said foldable casing is in the open position and for sensing whether the antenna is in the extended position, and for providing at least one sensing signal in response thereto; and an impedance matching system for matching an impedance of said antenna and an impedance of said radio, said method comprising:

sensing whether said foldable casing is in the open position, whether the antenna is in the extended position, and whether the portable radio terminal is transmitting or receiving;

determining an optimum varactor voltage value to match the impedances based on the position of the casing, the position of the antenna, and whether the portable radio terminal is transmitting or receiving; and

storing a digital value representing said optimum varactor voltage value in a memory location in said impedance matching system.

38. (Amended) The method of claim 37, wherein said determining and storing steps are performed when the portable radio terminal is in the states comprising:

the antenna is extended, the foldable casing is open, and the portable radio terminal is receiving;

the antenna is extended, the foldable casing is open, and the portable radio terminal is transmitting;

the antenna is extended, the foldable casing is closed, and the portable radio terminal is receiving;

the antenna is extended, the foldable casing is closed, and the portable radio terminal is transmitting;

the antenna is retracted, the foldable casing is open, and the portable radio terminal is receiving;

the antenna is retracted, the foldable casing is open, and the portable radio terminal is transmitting;

the antenna is retracted, the foldable casing is closed, and the portable radio terminal is receiving; and

the antenna is retracted, the foldable casing is closed, and the portable radio terminal is transmitting.

Please ADD new claims 39-70 as follows:

39. (New) The device as claimed in claim 18, wherein the controller and the CPU communicate by use of a Universal Asynchronous Receiver/Transmitter (UART).

40. (New) The device as claimed in claim 18, wherein the fixed increment is approximately 0.5V.

41. (New) The device as claimed in claim 18, wherein the fixed voltage level is approximately 255V.

42. (New) The device as claimed in claim 1, further comprising a sensor for sensing whether the portable radio telephone is transmitting or receiving and providing a signal indicating whether the portable radio telephone is transmitting or receiving.

43. (New) The device as claimed in claim 1, wherein the impedance according to the voltage of the controller is matched based on whether the portable radio telephone is receiving or the portable radio telephone is transmitting.

44. (New) The device as claimed in claim 43, wherein the transmit impedance is matched for a first frequency and the receive impedance is matched for a second frequency.

45. (New) The device as claimed in claim 1, wherein the impedance according to the voltage of the controller is matched based on at least one state of the portable radio telephone, including: the casing is folded and the portable radio telephone is receiving, the casing is folded and the portable radio telephone is transmitting, the casing is unfolded and the portable radio telephone is receiving, and the casing is unfolded and the portable radio telephone is transmitting.

46. (New) The device as claimed in claim 45, wherein the transmit impedance is matched for a first frequency and the receive impedance is matched for a second frequency.

47. (New) The device as claimed in claim 7, further comprising a means for sensing an extracted state and a retracted state of the antenna wherein the sensing means provides a signal indicating whether the antenna is in an extracted or retracted state.

48. (New) The device as claimed in claim 47, wherein the impedance according to the control voltage from the controller is matched according to at least one state comprising:

the retracted state of the antenna when the portable radio telephone is receiving, the retracted state of the antenna when the portable radio telephone is transmitting, the extracted state of the antenna when the portable radio telephone is receiving, and the extracted state of the antenna when the telephone is transmitting.

49. (New) The device as claimed in claim 48, wherein the transmit impedance is matched for a first frequency and the receive impedance is matched for a second frequency.

50. (New) The device as claimed in claim 11, further comprising a means for sensing whether the portable radio telephone is transmitting or receiving wherein the sensing means provides a sensing signal indicating whether the portable radio telephone is transmitting or receiving.

51. (New) The device as claimed in claim 50, wherein the means for matching impedances includes:

a controller for receiving the sensing signals, and providing a digital voltage corresponding to the sensing signal;

a digital-to-analog converter for converting the digital voltage into an analog voltage; and

a matching circuit for matching an impedance of the antenna and an impedance of the transmission/receiving circuit in response to the analog voltage.

52. (New) The device as claimed in claim 51, wherein the impedance of the transmission/receiving circuit in response to the sensing signal is optimal and distinct for each of the states including: the casing is folded and the portable radio telephone is receiving; the casing is folded and the portable radio telephone is transmitting; the casing is unfolded and the portable radio telephone is receiving; and the casing is unfolded and the portable radio telephone is transmitting.

53. (New) The device as claimed in claim 52, wherein the transmit impedance is matched for a first frequency and the receive impedance is matched for a second frequency.

54. (New) The device as claimed in claim 51, wherein the impedance of the transmission/receiving circuit in response to the sensing signal is optimal and distinct for each of the states including: the antenna is retracted and the portable radio telephone is receiving; the antenna is retracted and the portable radio telephone is transmitting; the antenna is extracted and the portable radio telephone is receiving; the antenna is extracted and the portable radio telephone is transmitting.

55. (New) The device as claimed in claim 54, wherein the transmit impedance is matched for a first frequency and the receive impedance is matched for a second frequency.

56. (New) The device as claimed in claim 51, wherein the impedance of the transmission/receiving circuit in response to the sensing signals is optimal and distinct based on each possible combination of the folded/unfolded state of the casing, the

retracted/extracted state of the antenna, and the transmit/receive state of the portable radio telephone.

57. (New) The device as claimed in claim 56, wherein the transmit impedance is matched for a first frequency and the receive impedance is matched for a second frequency.

58. (New) The portable radio terminal as claimed in claim 21, further comprising a means for sensing whether the portable radio terminal is transmitting or receiving wherein the sensing means produces at least one sensing signal indicating whether the portable radio terminal is transmitting or receiving.

59. (New) The device as claimed in claim 58, wherein the impedance matching system applies an optimal and distinct impedance based on whether the portable radio telephone is transmitting or receiving.

60. (New) The portable radio terminal as claimed in claim 58, wherein the impedance matching system applies an optimal and distinct impedance based on each of the states including:

the antenna is retracted and the portable radio telephone is receiving;

the antenna is retracted and the portable radio telephone is transmitting;

the antenna is extracted and the portable radio telephone is receiving; and

the antenna is extracted and the portable radio telephone is transmitting.

61. (New) The device as claimed in claim 60, wherein the transmit impedance is matched for a first frequency and the receive impedance is matched for a second frequency.

62. (New) The portable radio terminal as claimed in claim 58, wherein the impedance matching system applies an optimal and distinct impedance based each of the states including:

the case is in the folded position and the portable radio telephone is receiving;

the case is in the folded position and the portable radio telephone is transmitting;

the case is in the open position and the portable radio telephone is receiving; and

the case is in the open position and the portable radio telephone is transmitting.

63. (New) The device as claimed in claim 62, wherein the transmit impedance is matched for a first frequency and the receive impedance is matched for a second frequency.

64. (New) The portable radio terminal as claimed in claim 58, wherein the impedance matching system applies an optimal and distinct impedance based on each of the states including:

the case is in the folded position, and antenna is retracted, and the portable radio telephone is receiving;

the case is in the folded position, and antenna is retracted, and the portable radio telephone is transmitting;

the case is in the folded position, and antenna is extracted, and the portable radio telephone is receiving;

the case is in the folded position, and antenna is extracted, and the portable radio telephone is transmitting;

the case is in the open position, and antenna is retracted, and the portable radio telephone is receiving;

the case is in the open position, and antenna is retracted, and the portable radio telephone is transmitting;

the case is in the open position, and antenna is extracted, and the portable radio telephone is receiving; and

the case is in the open position, and antenna is extracted, and the portable radio telephone is transmitting.

65. (New) The device as claimed in claim 64, wherein the transmit impedance is matched for a first frequency and the receive impedance is matched for a second frequency.

66. (New) The device as claimed in claim 32, further comprising:

an antenna movable between a retracted position and an extended position; and

a sensor for sensing whether said whether said antenna is in the retracted position or the extended position and for producing at least one sensing signal indicating whether the antenna is in the retracted position or the extended position.

67. (New) The device as claimed in claim 66, wherein the impedance matching system provides an optimal and distinct voltage to the varactor for each of the states including:

the antenna is retracted and the portable radio terminal is in receive mode;